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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/137,084 08/20/98 STUMBORG

M 79329

MM92/0130

EXAMINER

JAMES B BECHTEL
NSWCDD CD222
DAHLGREN VA 22448-5100

VIL H	
ART UNIT	PAPER NUMBER

2811

DATE MAILED:

01/30/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/137,084

Applicant(s)

STUMBORG ET AL.

Examiner

HUNG VU

Group Art Unit

2811

☒ Responsive to communication(s) filed on Nov 14, 2000

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-13, 21, and 23-28 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) 1, 21, and 27 is/are allowed.

☒ Claim(s) 2-13, 23-26, and 28 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-13, 23-26, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (PN 5,962,921, of record).

Farnworth et al. discloses a semiconductor device comprising,

a substrate material (30,36) having a surface;

a barrier film (34) on the substrate surface, the barrier film having a layer comprising elemental barium atoms attached to the surface;

a conductor (12) on the barrier film, wherein barrier film inhibits diffusion of the conductor into the substrate;

wherein the barrier film is a single layer;

wherein the barrier film comprises a plurality of layers;

wherein the substrate material having a portion comprising a silicon semiconductor;

wherein the substrate material having a portion comprising an insulating material;

wherein the substrate having a portion comprising semiconductor silicon, and the barrier film directly contact the substrate. Note Figures 3-3C of Farnworth et al..

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Farnworth et al. discloses all of the claimed limitation except thickness of the elemental barium atoms layer. Although Farnworth et al. does not teach the exact the thickness of the elemental barium atoms layer, as that claimed by Applicant, the thickness differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Circ. 1990).

With regard to claims 11-13, Farnworth et al. discloses all of the claimed limitations except the conductor comprising copper and the substrate comprising silicon oxide. Although Farnworth et al. does not teach the exact the material as that claimed by Applicant, however, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the structure having the materials as claimed, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

2. Claims 2-13, 23-26, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukamoto et al. (PN 5,285,079, of record)

Tsukamoto et al. discloses a semiconductor device comprising,
a substrate material (101-104) having a surface;

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a barrier film on the substrate surface, the barrier film having a layer comprising elemental barium atoms attached to the surface;

a metallic conductor (106) on the barrier film, wherein barrier film inhibits diffusion of the conductor into the substrate;

wherein the substrate material is a silicon semiconductor, and the barrier film directly contacts the substrate. Note Figure 1 of Tsukamoto et al..

Tsukamoto et al. discloses all of the claimed limitation except thickness of the elemental barium atoms layer. Although Tsukamoto et al. does not teach the exact the thickness of the elemental barium atoms layer, as that claimed by Applicant, the thickness differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Circ. 1990).

With regard to claims 10-13, Tsukamoto et al. discloses all of the claimed limitations except the conductor comprising copper, and the substrate comprising silicon oxide. Although Tsukamoto et al. does not teach the exact the material as that claimed by Applicant, however, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the structure having the materials as claimed, since it has been held to be within the general skill of a

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worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Although Tsukamoto et al. does not clearly disclose a conductor having a tendency to diffuse into the substrate material if in direct contact, however, it is well-known in the semiconductor art that metal conductor has tendency to diffuse into a substrate.

Allowable Subject Matter

3. Claims 1, 21, and 27 are allowed.

4. The following is an examiner's statement of reasons for allowance:

Applicant's claims 1, 21, and 27 are allowable over the references of record because none of these references disclose or can be combined to yield the claimed invention such as the semiconductor device comprising, a substrate; a barrier film having a monolayer of elemental barium atoms on the substrate; and a metallic material on the barrier film.

Response to Arguments

5. Applicant's arguments with respect to claim 2 have been considered but are moot in view of the new ground(s) of rejection.

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Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Papers related to this application may be submitted to Technology Center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to ***Hung Vu*** whose telephone number is **(703) 308-4079**. The

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Examiner is in the Office generally between the hours of 7:00 AM to 5:30 PM (Eastern Standard Time) Monday through Thursday.

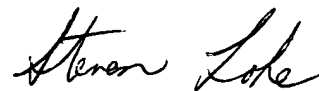
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Tom Thomas**, can be reached on **(703) 308-2772**.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **(703) 308-0956**.

Vu

January 27, 2001

Steven Loke
Primary Examiner

A handwritten signature in cursive script that reads "Steven Loke".